HITACHI

M-1 〔FT-M1, HA-M1〕 (W)

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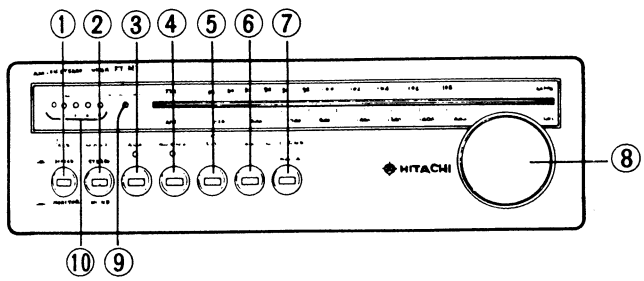
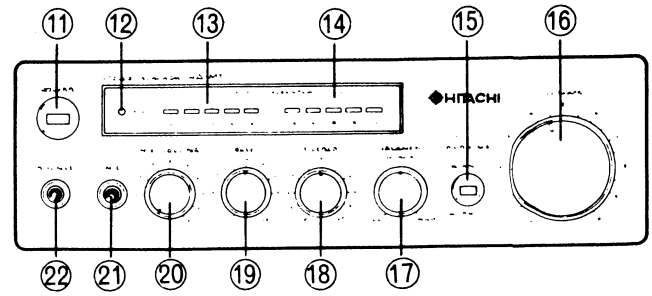
SERVICE MANUAL

No. 1220



STEREO TUNER (FT-M1)



STEREO AMPLIFIER (HA-M1)

KEY TO ILLUSTRATIONS

〈STEREO TUNER (FT-M1)〉

① TAPE MONITOR SWITCH
② MODE SWITCH
③ AUX SWITCH
④ PHONO SWITCH
⑤ FM BAND SWITCH
⑥ AM BAND SWITCH
⑦ HI-BLEND SWITCH
⑧ TUNING CONTROL
⑨ FM STEREO INDICATOR
⑩ TUNING INDICATOR

〈STEREO AMPLIFIER (HA-M1)〉

⑪ POWER (MAINS) SWITCH
⑫ POWER (MAINS) INDICATOR
⑬ LEVEL INDICATOR (LEFT)
⑭ LEVEL INDICATOR (RIGHT)
⑮ LOUDNESS SWITCH
⑯ VOLUME CONTROL
⑰ BALANCE CONTROL
⑱ TREBLE CONTROL
⑲ BASS CONTROL
⑳ MIXING VOLUME CONTROL
㉑ MICROPHONE SOCKET
㉒ HEADPHONE SOCKET

SAFETY PRECAUTION

The following precautions should be observed when servicing.

1. Since many parts in the unit have special safety related characteristics, always use genuine Hitachi's replacement parts. Especially critical parts in the power circuit block should not be replaced with other makers. Critical parts are marked with ⚠ in the schematic diagram, and circuit board diagram.
2. Before returning a repaired unit to the customer, the service technician must thoroughly test the unit to ascertain that it is completely safe to operate without danger of electrical shock.

STEREO TUNER/STEREO AMPLIFIER

July 1979

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SPECIFICATIONS

FT-M1 (AM-FM STEREO TUNER)

GENERAL SPECIFICATION

Semi-conductors :	IC's : 4
	Transistors : 16
	FET : 1
	LED's : 9
	Diodes : 10
Dimensions (H×W×D) :	7.4 (include the foot)×23.0×16.0cm
Weight :	1.8 kg

TUNER SECTION

Circuit system :	FM/AM 2 band superheterodyne
Frequency range :	FM : 87.5 to 108 MHz
	AM : 530 to 1605 kHz
Sensitivity :	FM : 2.0μV (THD 3%, 400 Hz 75 kHz Dev.)
	AM : 250μV/m (S/N 20 dB, 400 Hz 30% mod.)
FM capture ratio :	2 dB (1 mV, 75 kHz)
FM selectivity :	45 dB (±400 kHz)
Harmonic distortion :	0.5%
FM stereo separation :	40 dB (1 kHz)
FM Pilot suppression :	35 dB (19 kHz/38 kHz)
AM suppression :	40 dB
Image rejection :	50 dB
Intermediate frequency :	FM : 10.7 MHz
	AM : 455 kHz
Antenna (aerials) :	FM : External antenna (aerial) 300/75 ohms
	AM : Ferrite core antenna (aerial) or External antenna (aerial)
FM frequency response :	20 Hz to 15 kHz (±1.5 dB)

HA-M1 (STEREO AMPLIFIER)

GENERAL SPECIFICATION

Semi-conductors :	IC's : 5
	Transistors : 2
	[illegible] 11
	[illegible]s : 2
Power supply :	[illegible] : 100 to 120V or 200 to 240V 50/60 Hz
	DC : 12V (use car battery)
Dimensions (H×W×D) :	7.4 (include the foot)×23.0×16.0cm
Weight :	2.7kg

AMPLIFIER SECTION

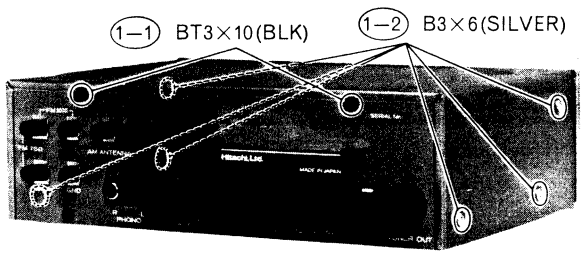
Output power :	Both channel driven
	15W×2 (4 ohms THD 5% 1 kHz) RMS
	18W×2 (4 ohms THD 5% 1 kHz) music power
	One channel driven
	18W (4 ohms THD 5% 1 kHz)
Frequency response :	20 Hz to 20 kHz (THD 0.8% ±1.5 dB)
Harmonic distortion :	0.2%
Damping factor :	30
Signal to Noise ratio :	FM mono : 65 dB
	FM stereo : 60 dB
Channel separation :	50 dB (1 kHz)
Tone control :	Bass : ±8 dB (at 100 Hz)
	Treble : ±10 dB (at 10 kHz)
Balance control :	0 to 100%
Input sensitivity/impedance :	PHONO: 2.5mV, 47 kohms
	AUX : 200mV, 47 kohms
	MIC : 0.2mV, 1 kohms
	Tape play : 600mV, 47 kohms
Output impedance :	Speaker : 4 ohms
	Headphone : 8 to 400 ohms

DISASSEMBLY

FT-M1 (STEREO TUNER)

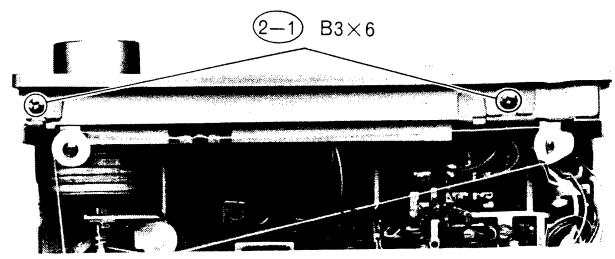
1. Top case

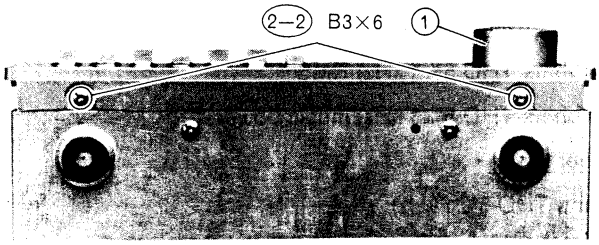
1) (1—1) 2 screws
2) (1—2) 6 screws



2. Front panel

1) Top case (See item 1)
2) (1) 1 Knob
3) (2—1) 2 screws
4) (2—2) 2 screws

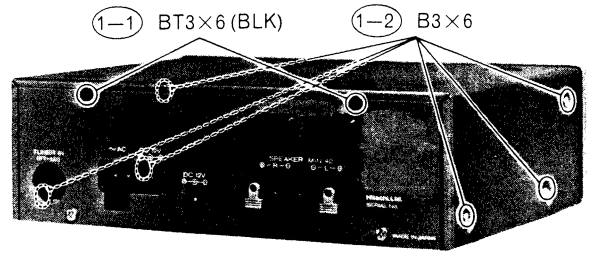




HA-M1 (STEREO AMPLIFIER)

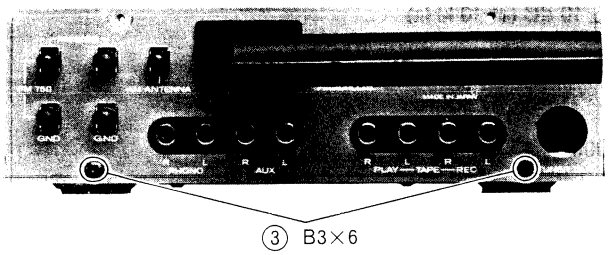
1. Top case

1) (1—1) 2 screws
2) (1—2) 6 screws



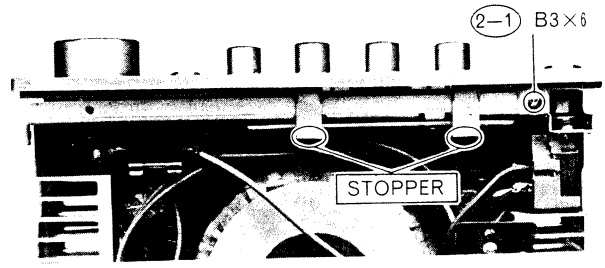
3. Back cover

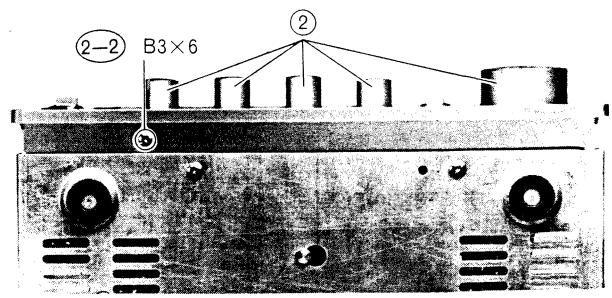
1) Top case (See item 1)
2) (3) 2 screws



2. Front panel

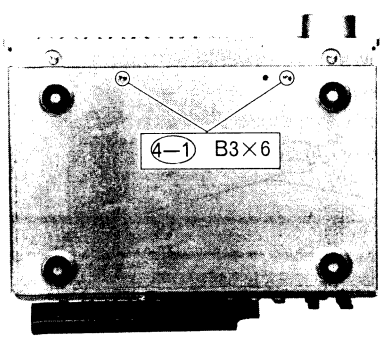
1) Top case (See item 1)
2) (2—1) 1 screw
3) (2—2) 1 screw
4) 2 stoppers
5) (2) 5 Knobs

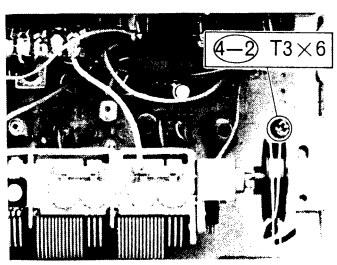




4. Bottom cover

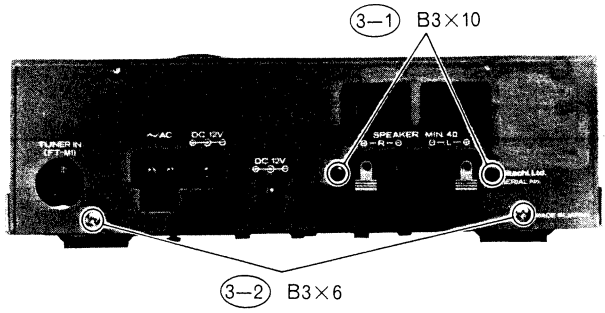
1) Back cover (See item 3)
2) (4—1) 2 screws
3) (4—2) 1 screw





3. Back cover

1) Top case (See item 1)
2) (3—1) 2 screws
3) (3—2) 2 screws

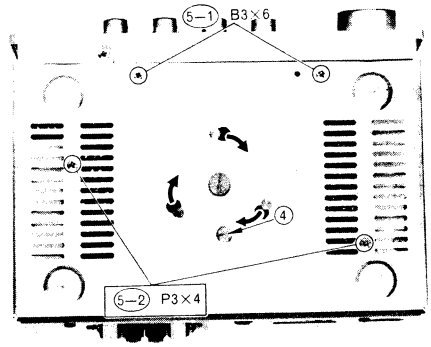


4. Power transformer

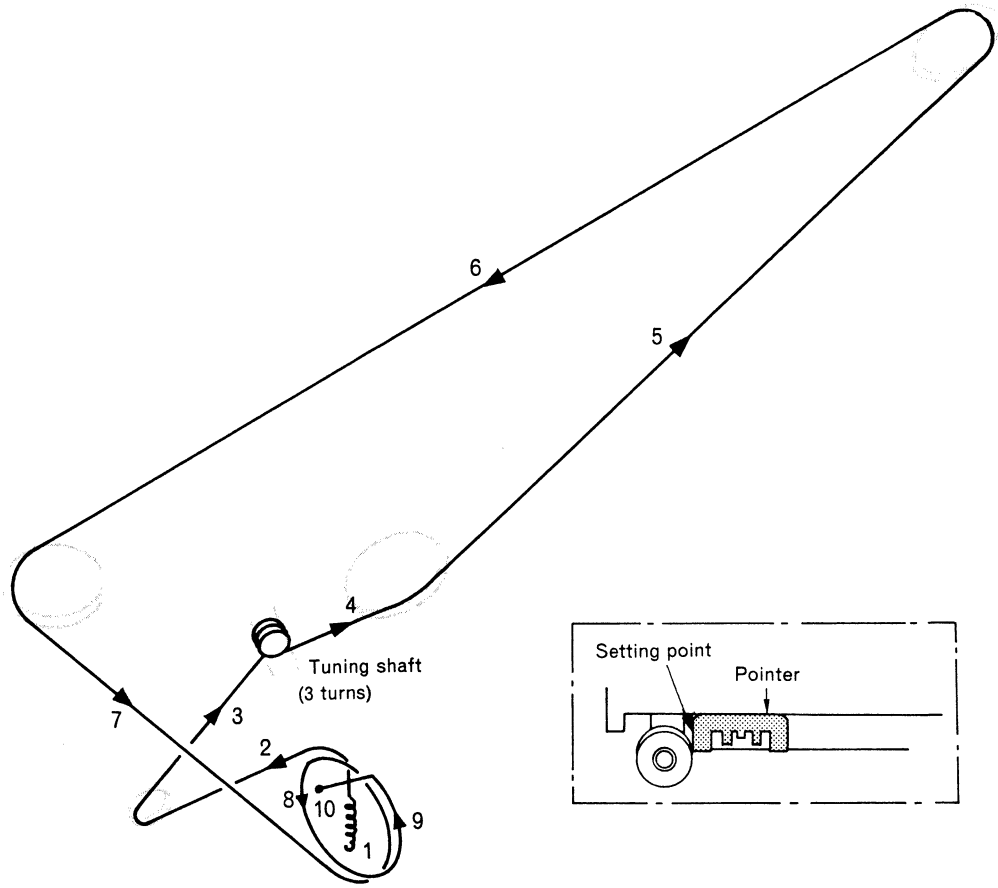
1) Top case (See item 1)
2) (4) 1 screw
3) Turn the power transforme in the direction of arrow.

5. Bottom cover

1) Power transformer (See item 4)
2) (5—1) 2 screws
3) (5—2) 2 screws



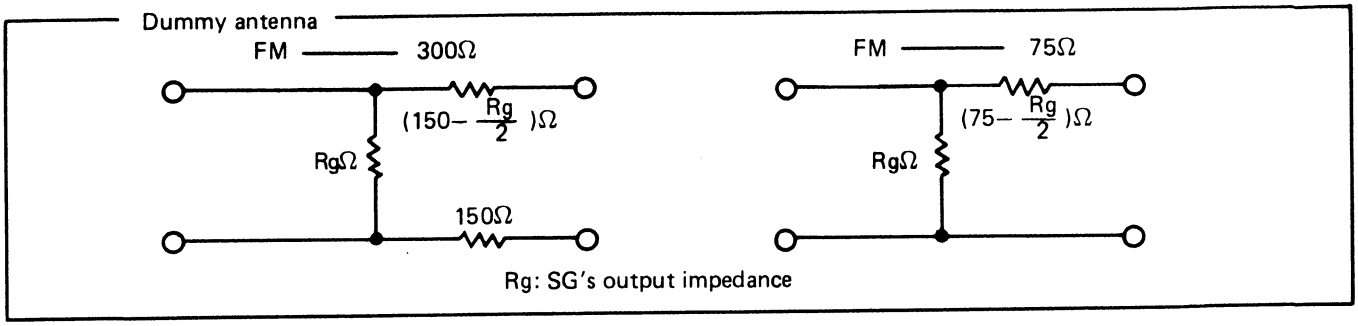
DIAL CORD STRINGING



STRINGING METHOD

1. Turn the pulley fully counterclockwise.
2. String the dial cord in the direction of arrow (No. 1~10).
3. Set the pointer to setting position.

ADJUSTMENT

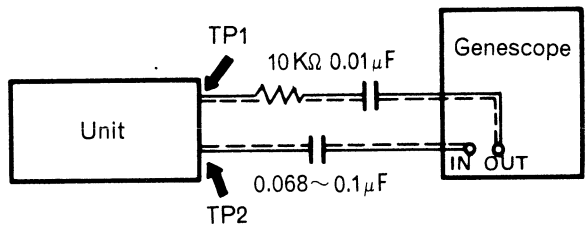


1. FM IF adjustment

Setting :

- FM switch : On
- Mode switch : Mono

Connection :



Adjustment :

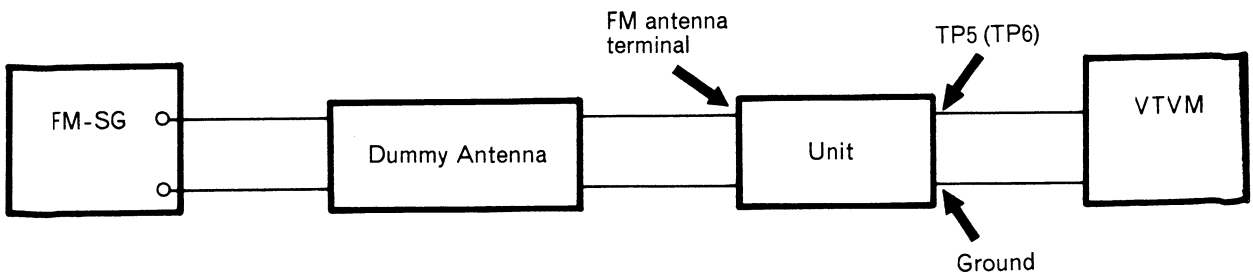
Genescope	Dial pointer position	Adjust	Reading	Remarks
10.7 MHz	Highest	T202	———	Turn the T202 fully counterclockwise.
		T103 T201	Maximum fc	1) fc: Specified center frequency of the ceramic filter. 2) Reduce the level of the genescope so that the waveform will be one.
		T202		Adjust the T202 so that the output is like the S curve for symmetrical sinewave.

2. FM RF (Covering & Tracking) adjustment

Setting :

- FM switch : On
- Mode switch : Mono

Connection :



Adjustment :

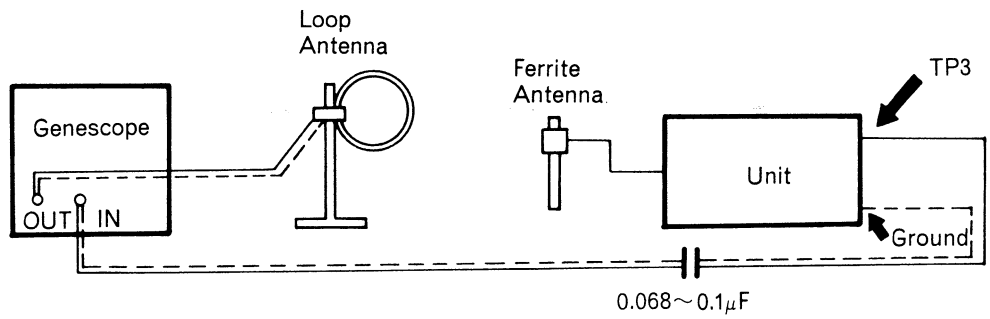
Item		Signal generator		Dial pointer position	Adjust	Reading	Remarks
		Frequency	Modulation				
1	Covering	87.25 MHz	400 Hz 30%	Lowest	L102	Max.	—
2		109 MHz		Highest	CT103		
3	Repeat 1 and 2.						
4	Tracking	90 MHz	400 Hz 30%	90 MHz	T101, T102	Max.	
5		106 MHz		106 MHz	CT101, CT102		
6	Repeat 4 and 5.						

3. AM IF adjustment

Setting :

● AM switch : On

Connection :



Adjustment :

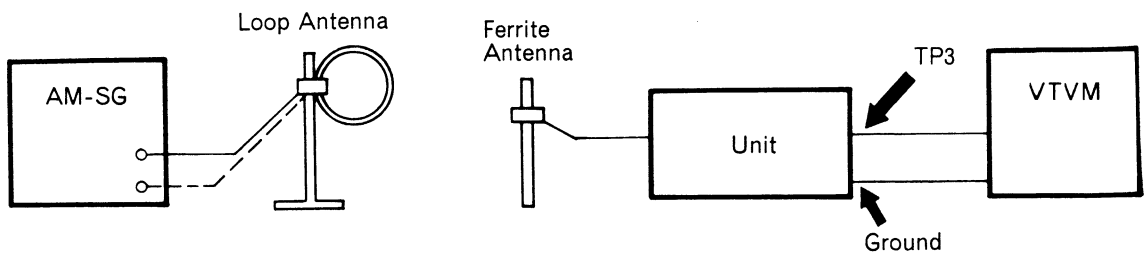
Genescope		Dial pointer position	Adjust	Reading	Remarks
Frequency	Modulation				
455 kHz	—	Highest	T153, T203	Max.	—

4. AM RF (Covering & Tracking) adjustment

Setting :

● AM switch : On

Connection :



Adjustment :

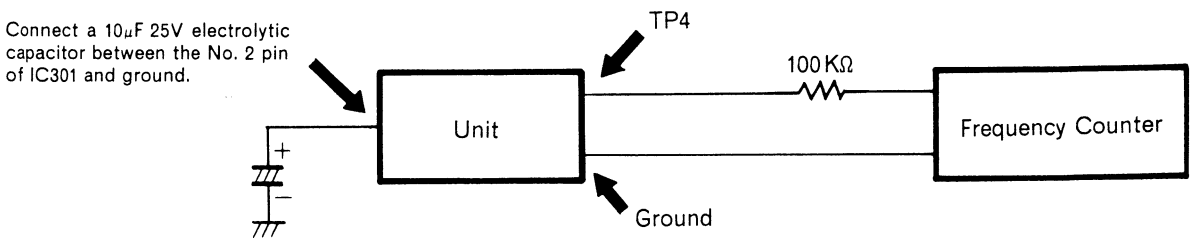
Item		Signal generator		Dial pointer position	Adjust	Reading	Remarks
		Frequency	Modulation				
1	Covering	515 kHz	400 Hz 30%	Lowest	T152	Max.	—
2		1650 kHz		Highest	CT152		
3	Repeat 1 and 2.						
4	Tracking	600 kHz	400 Hz 30%	600 kHz	T151	Max.	
5		1400 kHz		1400 kHz	CT151		
6	Repeat 4 and 5.						

5. FM MPX (Multiplex) adjustment

Setting :

- FM switch : On
- Mode switch : Stereo

Connection :



Adjustment :

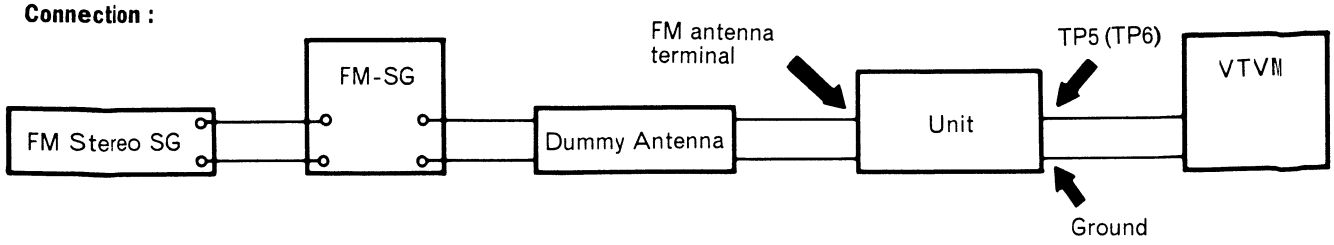
Adjust	Reading	Remarks
RT302	19 kHz±100 Hz	—

6. FM separation adjustment

Setting :

- Mode switch : Stereo
- FM switch : On

Connection :

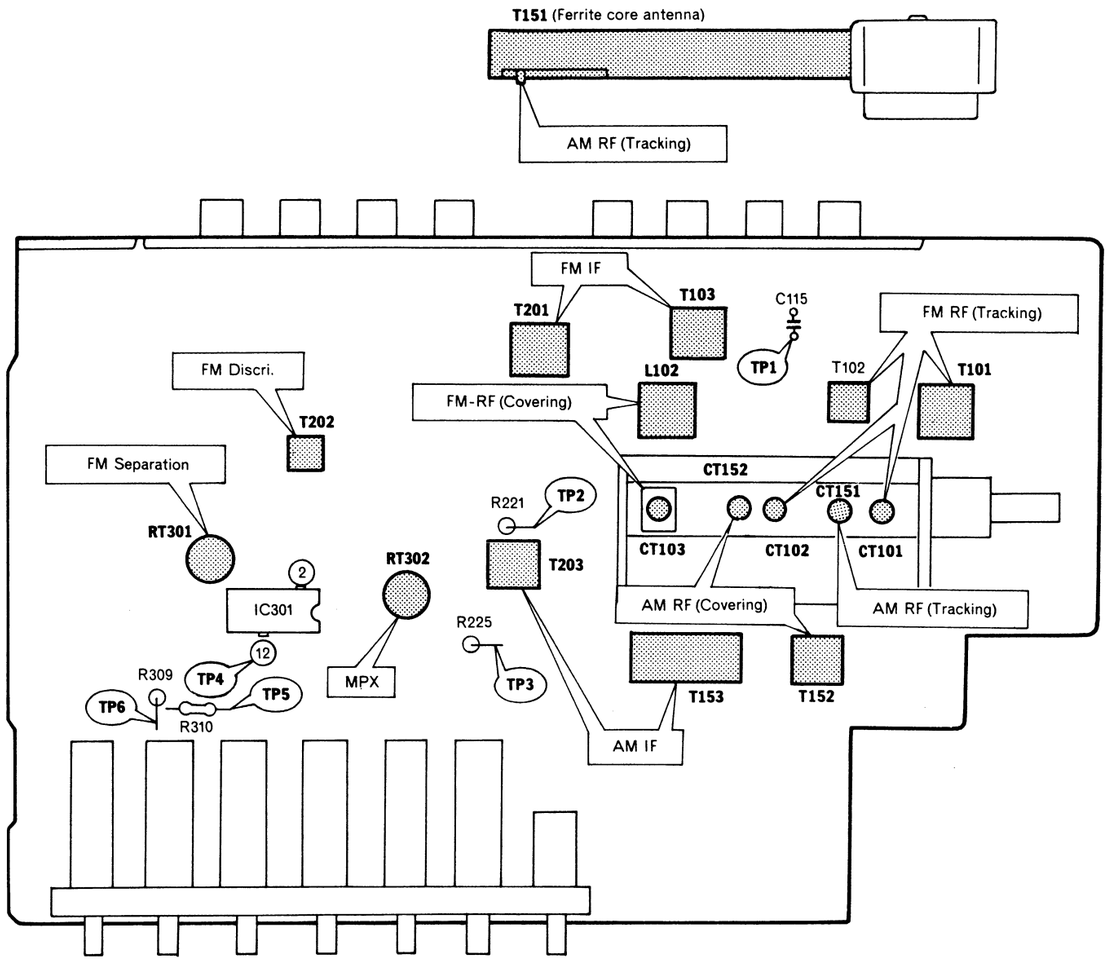


Adjustment :

Signal generator		Dial pointer position	Adjust	Reading	Remarks
Frequency	Modulation				
98 MHz 60 dB	L+R(1 kHz) : 40 kHz dev. Pilot(19 kHz) : 6 kHz dev.	98 MHz	RT301	Min.	1) After feeding in of R channel and pilot signals, adjust RT301 for a minimum L channel output. 2) Optimize RT301 so that the leak level of the L channel signal is equal to that of the R channel signal.

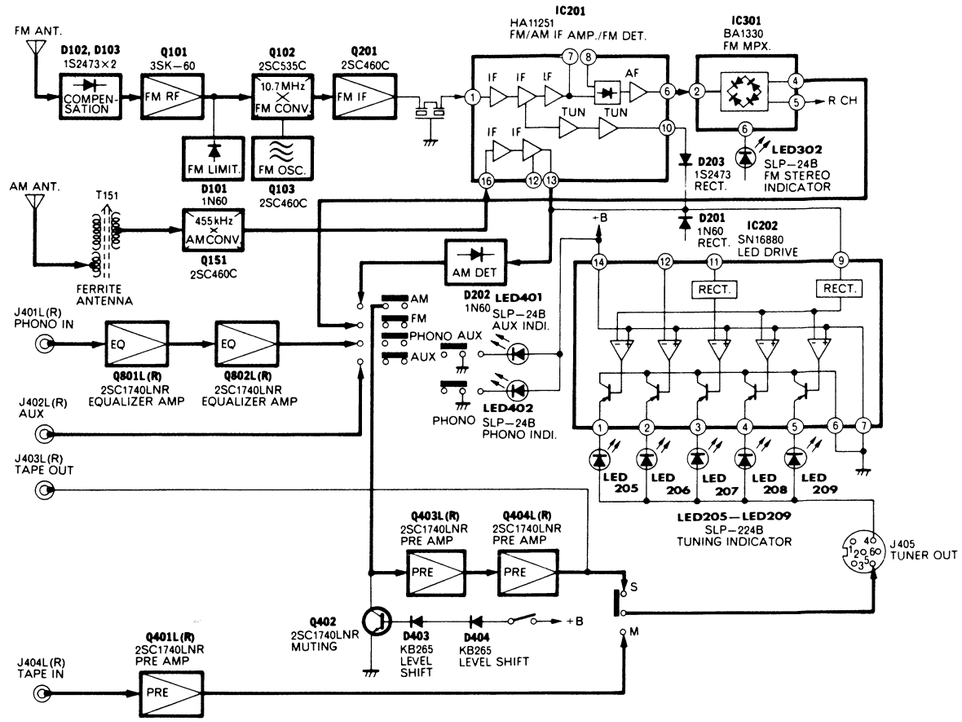
M-1 (FT-M1, HA-M1) (W)

Adjustment Parts Location

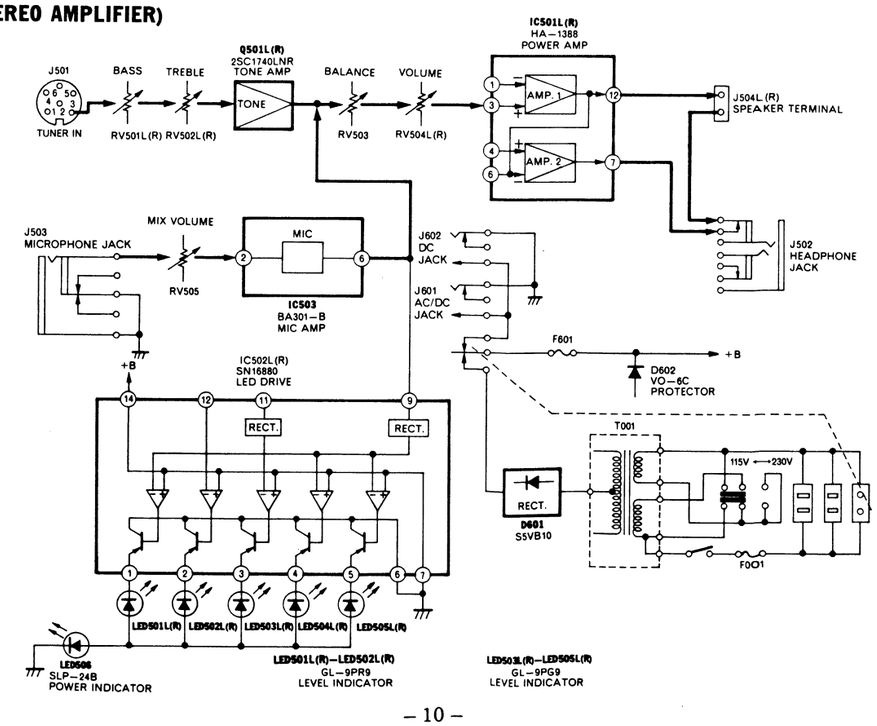


BLOCK DIAGRAM

FT-M1 (STEREO TUNER)



HA-M1 (STEREO AMPLIFIER)



SCHEMATIC DIAGRAM (FT-MI)

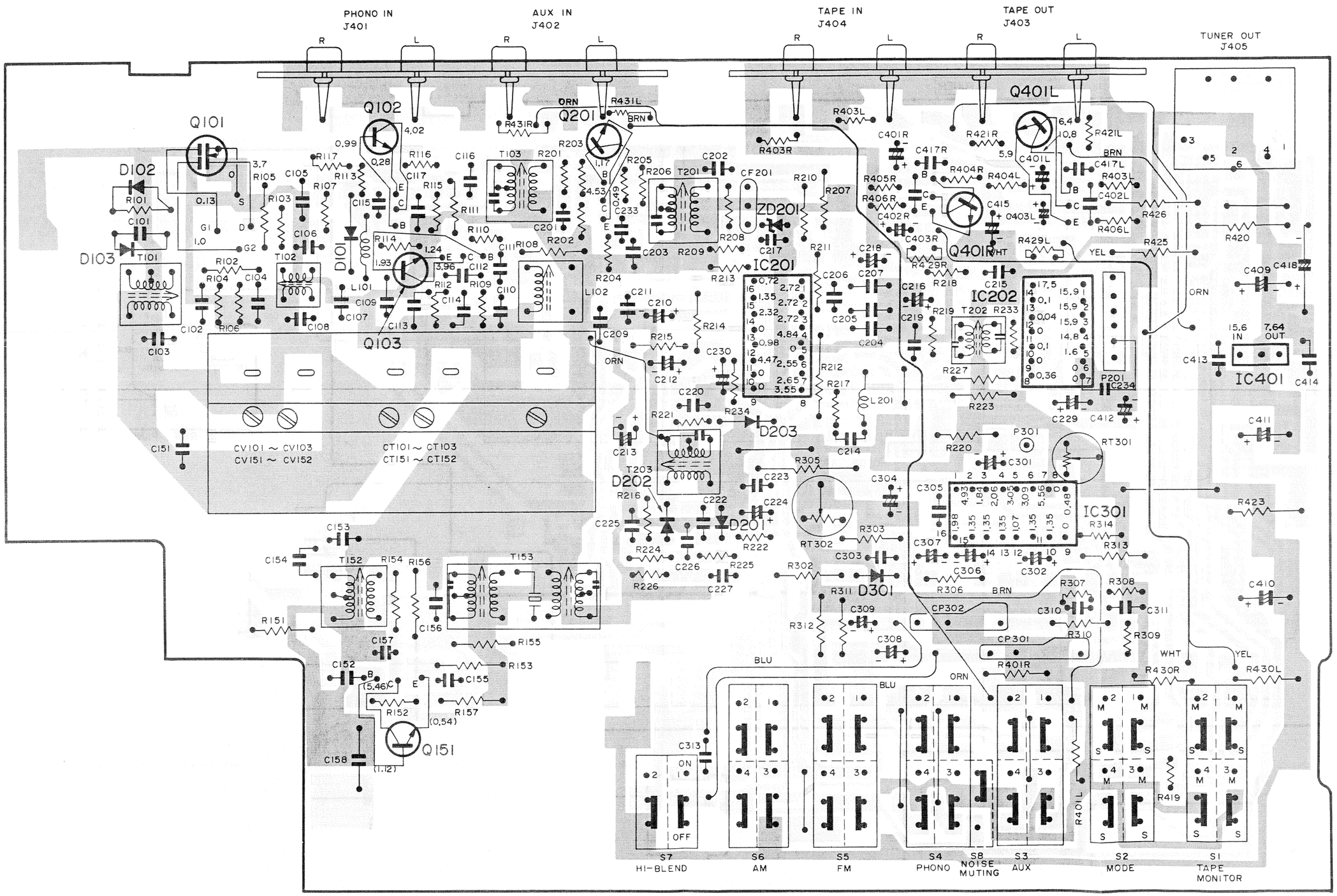
D102, D103 IS2473 COMPENSATION
Q101 3SK-60 FM RF AMP.
Q103 2SC460C FM OSC.
Q151 2SC460C AM OSC.
D101 IN60 FM LIMITER
Q102 2SC535C FM CONV.
Q201 2SC460C FM IF AMP.
IC201 HAI1251 FM/AM IF AMP./ FM DISCRI.
D201 IN60 RECT.
D202 IN60 AM DET.
LED401 SLP-24B AUX INDICATOR
LED402 SLP-24B PHONO INDICATOR
D203 IS2473 RECT.
IC301 BAI330 FM MPX.
D301 IS2473 BACK CURRENT CHECK
ZD201 HZ4BC VOLT. STAB.

FM ANT.
AM ANT.
PHONO IN
TAPE OUT
TAPE IN
TUNER OUT
J405
LED610

Q801L,R Q802L,R 2SC1740LNR EQUALIZER AMP.
LED610 GL-3IAR POINTER INDICATOR
Q401L,R 2SC1740LNR PRE AMP.
Q402L,R 2SC1740LNR MUTING
D403, D404 KB265 LEVEL SHIFT
Q403L,R Q404L,R 2SC1740LNR PRE AMP.
IC401 78L08A VOLT. STAB.
IC202 SN16880 LED DRIVE
LED205–D209 SLP-224B TUNING INDICATOR
LED302 SLP-24B FM STEREO INDICATOR

CIRCUIT BOARD DIAGRAM (FT-M1)

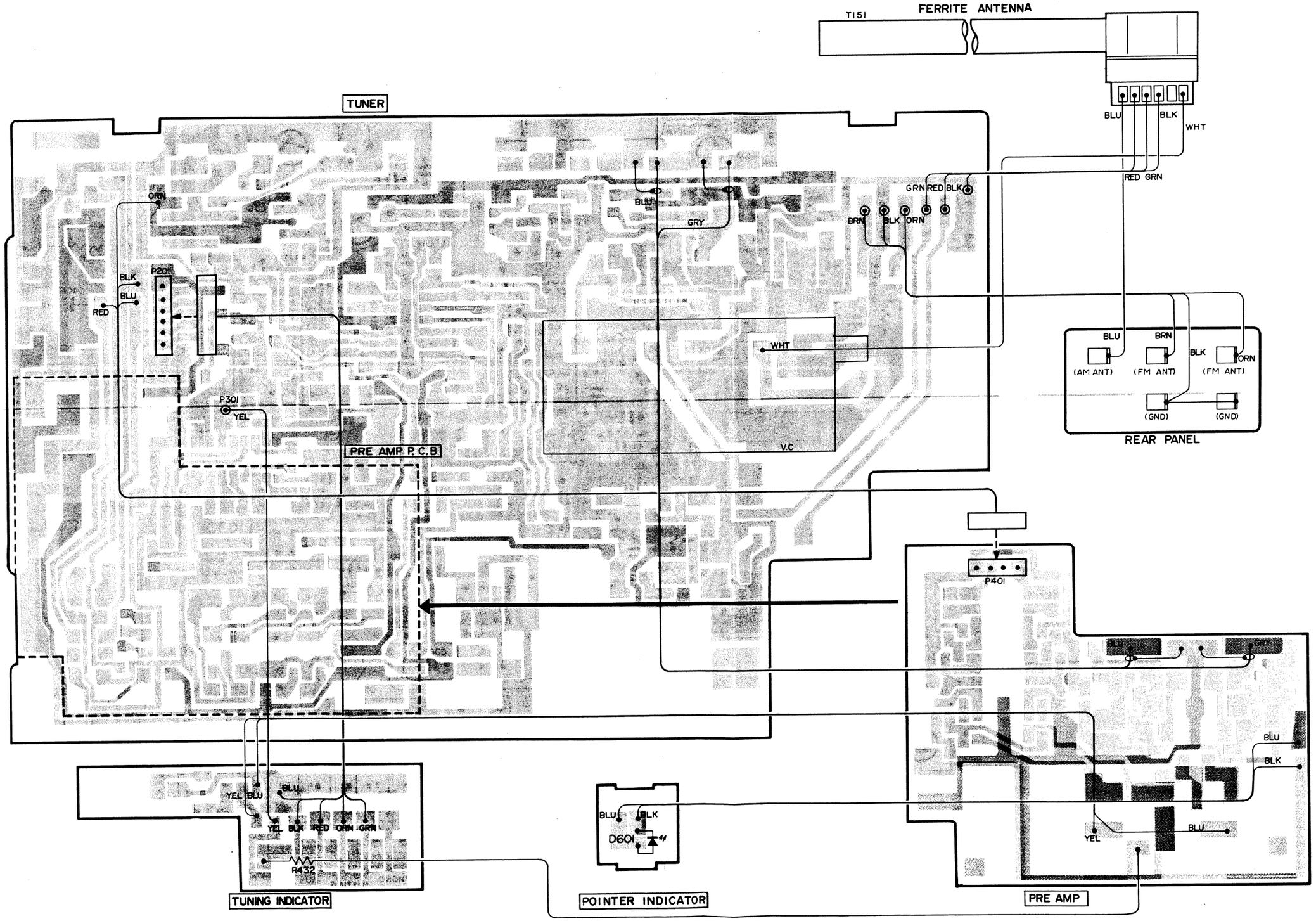
: Ground : Signal, +B



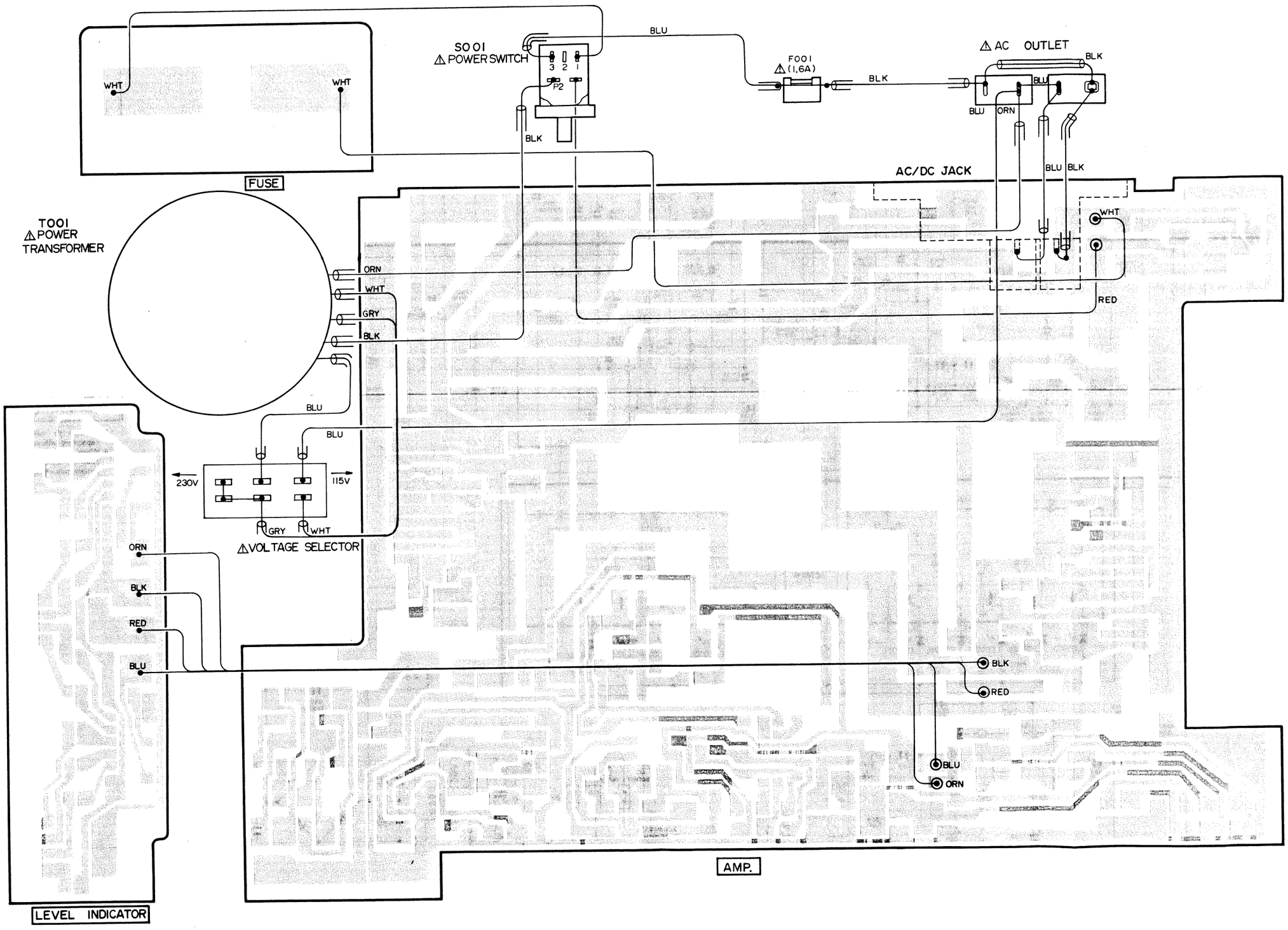
TUNER

M-1 〔FT-M1, HA-M1〕(W)

WIRING DIAGRAM (FT-M1)

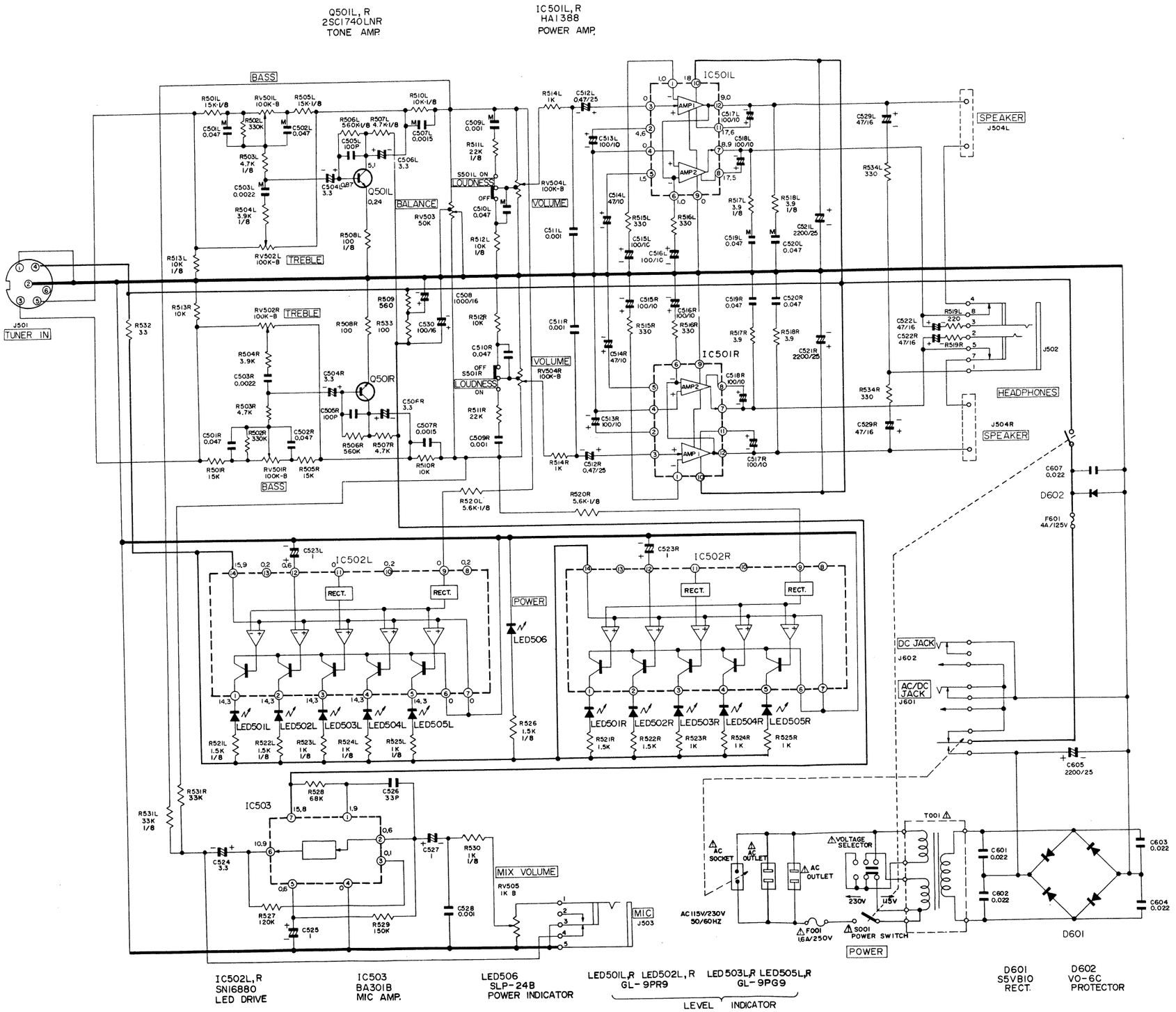


WIRING DIAGRAM (HA-M1)



M-1 (FT-M1, HA-M1) (W)

SCHEMATIC DIAGRAM (HA-MI)



Note

1. Voltage measured at base of chassis with minimum volume control and no signal.
2. Nomenclature of Resistors and Capacitors.

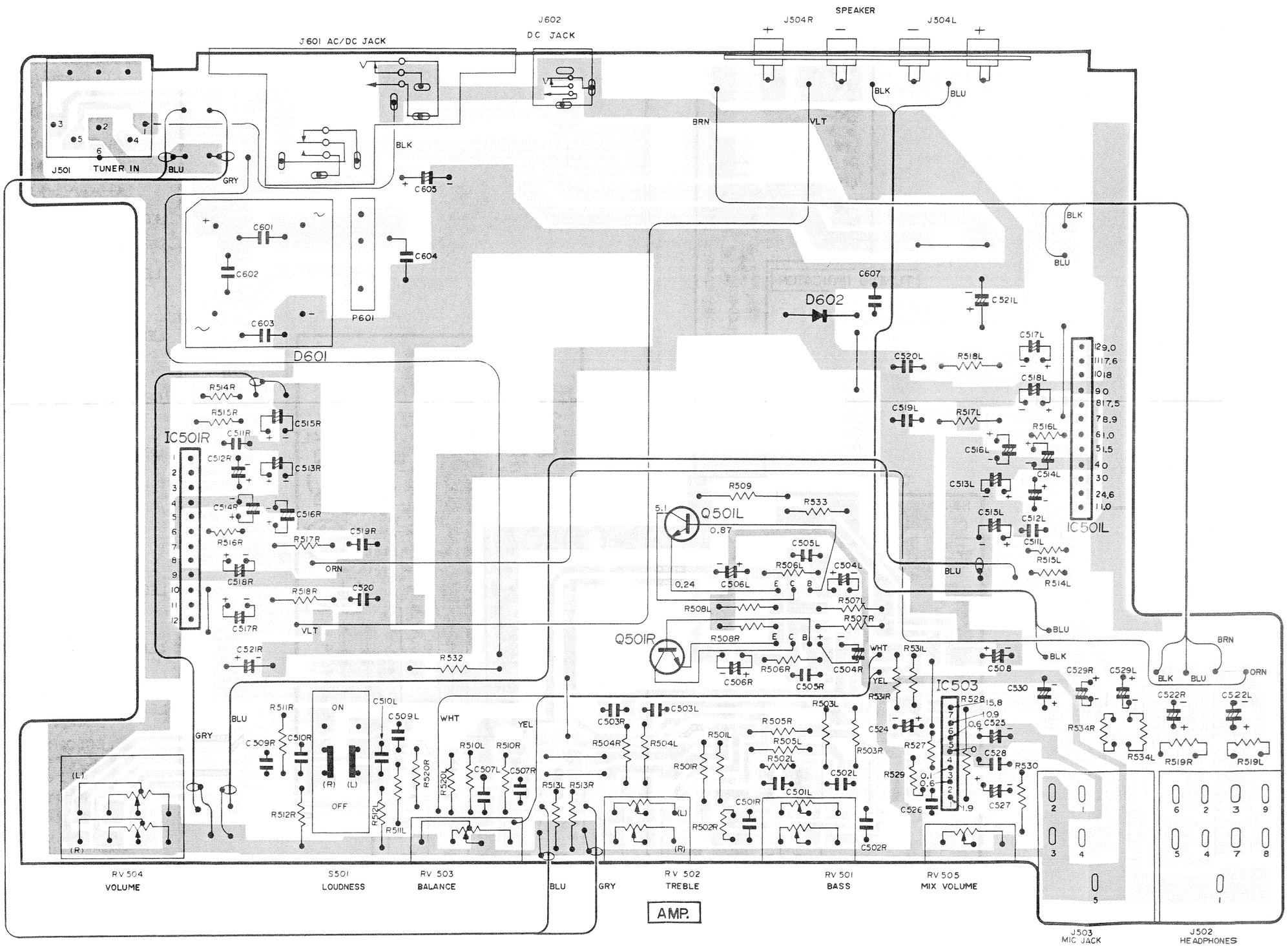
	Circuit No.
Value	No indicated Ω (Ohm) M : 1000 kΩ
Tolerance	No indicated ±5% K : ±10% M : ±20%
Wattage	No indicated ¼W
Sort	No indicated Carbon film RC : Composition RW : Wire wound RS : Oxide metal film RN : Fixed metal film

	Circuit No.	
Value	No indicated μF P : PF	
Tolerance	No indicated ±10% J : ± 5% M : ±20% Z : +80%, −20% D : ±0.5pF C : ±0.25pF	
Sort		Ceramic
		Electrolitic
		Mylar
		Polyester
		Styrol
Voltage	No indicated 50WV	

3. Be sure to make your orders of resistors and capacitors with value, voltage, tolerance and sort.
4. When replacing capacitors marked with ✻, use specified ones stated on parts list since required temperature characteristics.

CIRCUIT BOARD DIAGRAM (HA-MI)

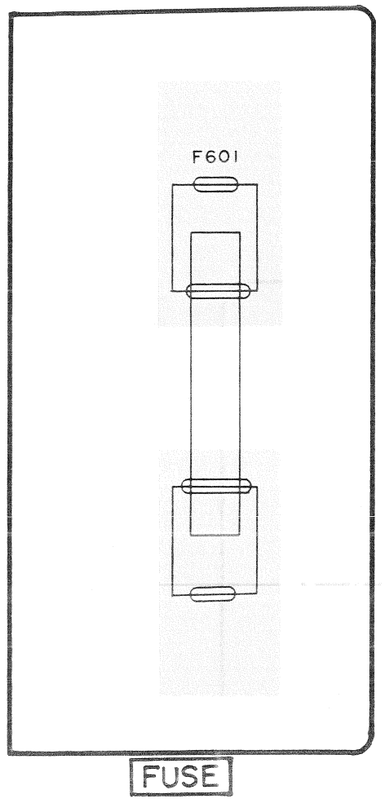
: Ground : Signal, +B

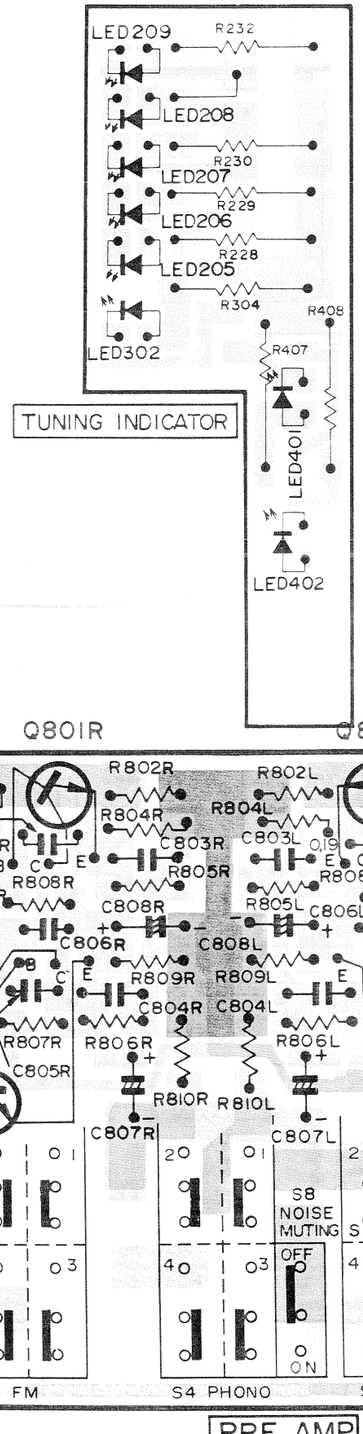


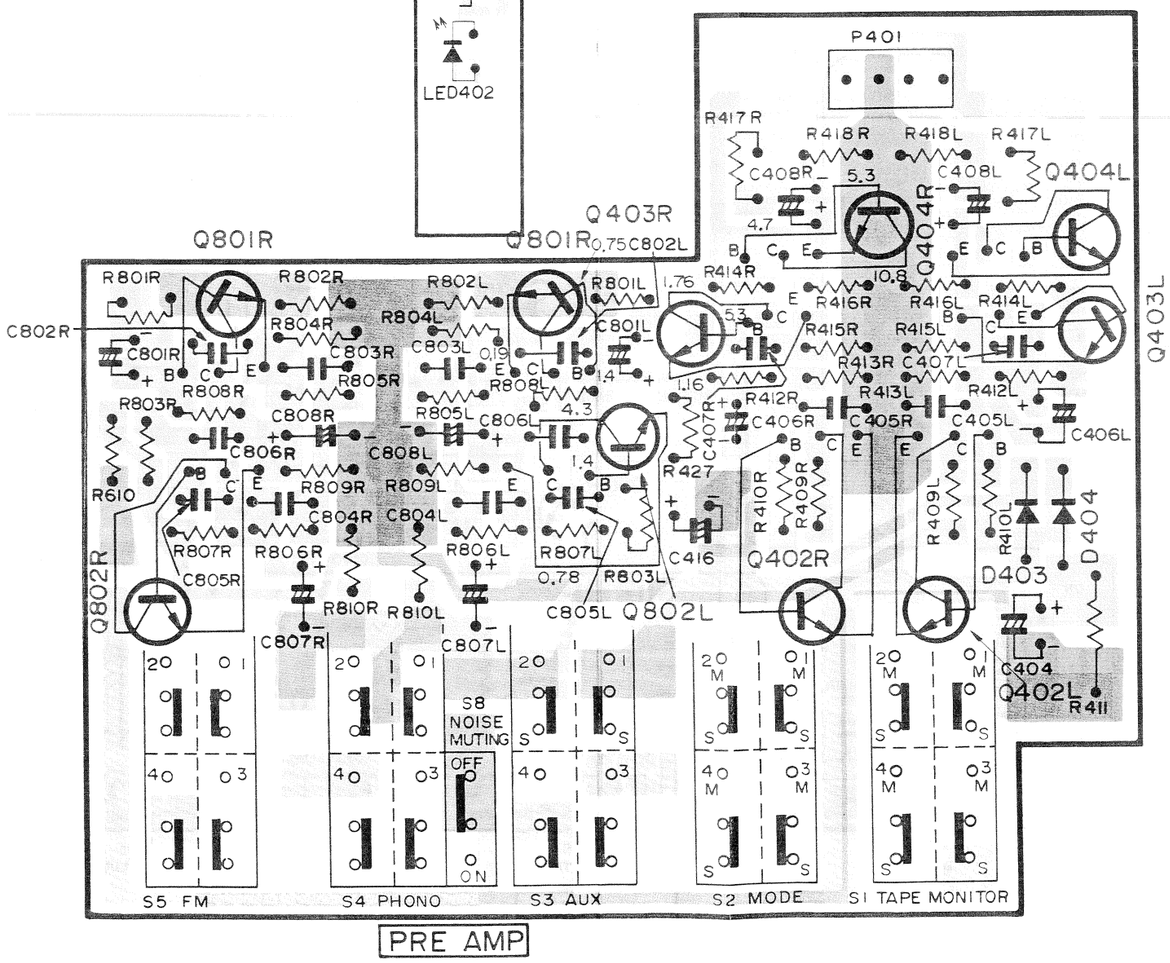
M-1 (FT-M1, HA-M1) (W)

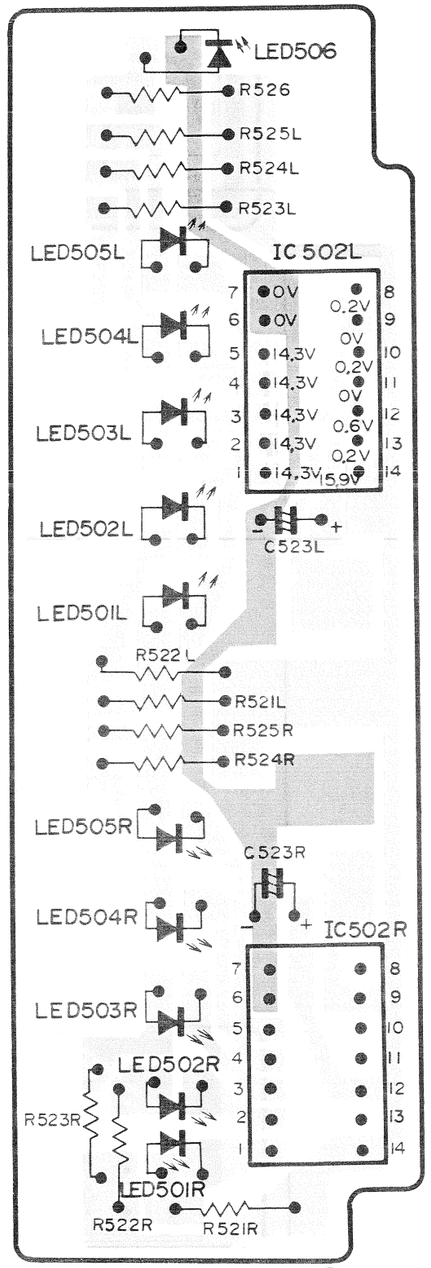
CIRCUIT BOARD DIAGRAM (FT-M1/HA-M1)

: Ground : Signal, +B : Component side pattern









REPLACEMENT PARTS LIST

SYMBOL-NO	P-NO	DESCRIPTION
		CAPACITORS
C101	0246425	CERAMIC DISC 5P-D
C103	0246474	CERAMIC DISC 15PF+-10%(NP-0)
C107	0246425	CERAMIC DISC 5P-D
C108	0246476	CERAMIC DISC 18PF+-10%
C109	0246421	CERAMIC DISC 1PF+-0.5PF (NP-0)
C110	0248218	CERAMIC DISC 22PF
C111	0246474	CERAMIC DISC 15PF+-10%(NP-0)
C112	0246474	CERAMIC DISC 15PF+-10%(NP-0)
C113	0246474	CERAMIC DISC 15PF+-10%(NP-0)
C151	0246425	CERAMIC DISC 5P-D
C153	0246474	CERAMIC DISC 15PF+-10%(NP-0)
C303	0221331	POLYSTYROL FILM 680PF
VC101	5050011	VARIABLE
		RESISTORS
RT301	5007184	SEMI VARIABLE 2.2K OHM
RT302	5007186	SEMI VARIABLE 10K OHM
RV501LR	5000046	VARIABLE 100K OHM(B)
RV502LR	5000046	VARIABLE 100K OHM(B)
RV503	5000284	VARIABLE 50K OHM (B)
RV504LR	5000515	VARIABLE 100K OHM(B)
RV505	5000118	VARIABLE 10 OHM(B)
		SEMI-CONDUCTORS
D101	5330731	DIODE GERMANIUM 1N60 80MHZ 50MW
D102	5330573	DIODE SILICON 1S2473 300MHZ 300MW
D103	5330573	DIODE SILICON 1S2473 300MHZ 300MW
D201	0575005	DIODE GERMANIUM 1N60 80M
D202	0575005	DIODE GERMANIUM 1N60 80M
D203	5330573	DIODE SILICON 1S2473 300MHZ 300MW
LED205-209	5380111	RADIATION DIODE SLP-224B
D301	5330573	DIODE SILICON 1S2473 300MHZ 300MW
LED302	5380101	RADIATION DIODE SLP-248
LED401	5380101	RADIATION DIODE SLP-248
LED402	5380101	RADIATION DIODE SLP-248
D403	5340161	VARISTOR KB265
D404	5340161	VARISTOR KB265
LED501LR	5380391	LED GL-9PR9
LED502LR	5380391	LED GL-9PR9
LED503LR	5380392	LED GL-9PG9
LED504LR	5380392	LED GL-9PG9
LED505LR	5380392	LED GL-9PG9
LED506	5380101	RADIATION DIODE SLP-248
D601	5330831	DIODE S5VB10
D602	5330101	DIODE SILICON V06C 15K
LED610	5380041	LED GL-31AR
IC201	5351411	IC HA11251
IC202	5350761	IC SN16880
IC301	5350684	IC HA1330
IC401	5359332	IC 78L08A
IC501LR	5352071	IC HA1388
IC502LR	5350761	IC SN16880
IC503	5350271	IC BA301B
Q101	5322151	TRANSISTOR 3SK60
Q102	0573511	TRANSISTOR SILICON 2SC535 700M
Q103	0573487	TRANSISTOR 2SC460C
Q151	0573487	TRANSISTOR 2SC460C
Q201	0573487	TRANSISTOR 2SC460C
Q401LR	5321293	TRANSISTOR 2SC1740LN-R
Q402LR	5321293	TRANSISTOR 2SC1740LN-R
Q403LR	5321293	TRANSISTOR 2SC1740LN-R
Q404LR	5321293	TRANSISTOR 2SC1740LN-R
Q501LR	5321293	TRANSISTOR 2SC1740LN-R
Q801LR	5321293	TRANSISTOR 2SC1740LN-R
Q802LR	5321293	TRANSISTOR 2SC1740LN-R
ZD201	5330711	ZENER DIODE HZ4BC
		TRANSFORMERS
⚠ T001	5212673	POWER
T101	5123558	FM ANTENNA
T102	5126485	FM RF
T103	0329606	FM IF
T151	5113411	FERRITE ANTENNA
T152	5120461	AM OSCILLATOR COIL
T153	5160021	AM IF
T201	0329606	FM IF
T202	5140017	FM IF
T203	0322118	AM IF 20K OHM:10K OHM
		COILS
L101	5152064	CHOKE 1.8MICRO H
L102	5123355	FM OSCILLATOR
L201	5150821	CHOKE 18MICRO H
		MISCELLANEOUS
⚠	5620544	SLIDE SWITCH (VOLTAGE SELECTOR)
⚠	5652193	AC OUTLET
CF201	5160241	CERAMIC FILTER 10.7MF
CP301	5161731	LCR FILTER
CP302	5161731	LCR FILTER
⚠ F001	5721061	FUSE 1.6A
F601	5720263	FUSE 4A
J401LR	5676082	PIN JACK
J402LR	5676082	PIN JACK
J403LR	5676082	PIN JACK
J404LR	5676082	PIN JACK
J405	5677081	6P DIN SOCKET
J501	5677081	6P DIN SOCKET
J502	5674083	HEADPHONE JACK
J503	5674141	MIC JACK

SYMBOL-NO	P-NO	DESCRIPTION
		MISCELLANEOUS
J504LR	5687351	4P PUSH TERMINAL
⚠ J601	5652121	POWER SOCKET
J602	5678061	DC JACK
⚠ S001	5633271	POWER SWITCH
S1—S7	5634278	PUSH SWITCH (TAPE, MODE, AUX, PHONO, FM, AM, HI-BLEND)
S501LR	5634166	PUSH SWITCH (LOUDNESS)
		FOR ACCESSORIES
	5896541	DC PULG CORD
⚠	5747214	POWER CORD
	5896392	FM ANTENNA
	5896771	DIN CORD
	5660212	SIEMENS PLUG
	5897422	CAR BATTERY CORD
		MISCELLANEOUS (HA-M1)
	7740372	FELT LEG
	6283223	KNOB ASSEMBLY-34MMD (VOLUME)
	6283212	KNOB ASSEMBLY-14MMD (MIX VOLUME, BASS, TREBLE, BALANCE)
	6041328	UPPER COVER
	8699410	BT BIND HEAD SCREW-3MMDX10MM (BLACK) (FOR UPPER COVER FIXING)
	7547791	SPECIAL SCREW (FOR POWER TRANSFORMER FIXING)
	7535187	LOCK LEVER PIN

SYMBOL-NO	P-NO	DESCRIPTION
	6222792	FRONT PANEL ASSEMBLY
	6052041	PUSH BUTTON (LOUDNESS)
	6052042	PUSH BUTTON (POWER)
	6222772	REAR PANEL
	6041335	UNDER COVER
	6631941	DISPLAY METAL
		MISCELLANEOUS (FT-M1)
	7740372	FELT LEG
	6222912	FRONT PANEL ASSEMBLY
	6283222	KNOB ASSEMBLY-34MMD (TUNING)
	6052041	PUSH BUTTON (TAPE, MODE, AUX, PHONO, FM, AM, HI-BLEND)
	6041327	UPPER COVER
	8699410	BT BIND HEAD SCREW-3MMDX10MM (BLACK) (FOR UPPER COVER FIXING)
	6041332	UNDER COVER
	6715061	ROLLER - 13MMD
	7777603	SCREW (FOR ROLLER FIXING)
	6376251	FLYWHEEL ASSEMBLY
	6467622	SCALE PLATE
	6399902	POINTER
	6345081	PULLEY
	6316233	SPRING M
	6222862	REAR PANEL
	7450912	TERMINAL PIECE

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